

## HOW TO WORK MILD STEEL.

The occasional failure of steel plates in boiler and other work, is generally attributed to the want of sufficient information on the part of the workmen. To prevent, as far as practicable, the possibility of failure in steel plates, caused by deficient information as to the proper method of treating this material, the Steel company of Scotland has published and directs the attention of users of steel to the following rules:

(1st) **Welding**—In welding mild steel plates it is not necessary to heat them to the same high temperature as in the case of iron. Instead of a "welding heat," a bright yellow heat is sufficient; and if flux is required, it need only be three parts clean sand to one part common salt, moistened, and thrown on the weld in the fire. We recommend that the weld be of the V form, in preference to the lap, and that it be treated in the usual way—that is, lightly hammered on the V part. After the weld is made and while the heat is good, the parts near and on either side of the weld should be lightly hammered. In making the weld, the fuel should be free of sulphur, otherwise red-shortness may result.

(2d) **Flanging**—In flanging, care should be taken in the local heating that the parts are not overheated, and that no hammering or work is put upon them while at a black heat; further, it would be well if work could be continuous until each flange is completed, or if the plate has to be laid aside before it is finished, it should be protected from chills, if it is not convenient to keep it warm.

(3d) **Annealing**—After completing either welding or flanging, the whole piece should be heated to a cherry-red heat, and slowly cooled.

(4th) **Orders**—In ordering steel plates, care should be taken to state the purpose for which they are to be used, especially in cases where they are required to weld and flange.

**EFFECT OF THE ELECTRIC LIGHT ON THE EYES.**—The evil effects of the electric light upon the eyes is said to be due to its constant variations of intensity, which give rise to sudden and frequent changes in the pupil, and, consequently, in the "accommodation" of the eye, by which is meant that alternate contraction and dilation of the pupil, by which it suits itself to the variations of light. Such a light, therefore, causes not only muscular fatigue, but also a considerable degree of blurring and indistinctness in the retinal image. The eye suffers both when the light is too dim and when it is too bright. In the former case the object must be brought close to be clearly seen, and an increased accommodative effort is called for, which, in most cases, results in nearsightedness. In the latter case, the simple intensity of the light produces undue contraction of the pupil, and an increase of tension within the eye. This objection has much more weight where carbon electrodes are used, than where the illumination is produced from the incandescence of some intercepting body like platinum or Edison's incandescent carbons.

**THE STEAM JACKET.**—There is much discussion among engineers about the steam jacket as applied to steam engines. The articles in mechanical journals upon this topic, *pro* and *con* are legion. The poet truly says: "The proper study for mankind is man," but mankind have more, infinitely more, to say about the human jacket, than they have about the wonderful being which it is intended to protect and adorn; and so engineers harp on the steam jacket without end, to the manifest disadvantage of the more important machine which it sometimes helps to keep warm.

"I WANT you to put on a new pair of heels to these boots," said Dr. Ipecac to the shoemaker. "Why don't you do it yourself, Doctor?" asked old Waxenda. "I!" said the Doctor in astonishment. "Why, yes. Does not the good book say, 'Physician, heel thyself!'"

## COLOR RELATIONS OF METALS.

In a paper on the color relations of copper, nickel, cobalt, iron, manganese and chromium, read before the Chemical society, Mr. T. Bayley records some remarkable relations between solutions of these metals. It appears that iron, cobalt and copper form a natural color group, for if solutions of their sulphates are mixed together in the proportions of 20 parts of copper, eight of iron and six of cobalt, the resulting liquid is free from color, but is gray and partially opaque. It follows from this that a mixture of any two of these elements is complementary to the third, if the above proportions are maintained. Thus a solution of cobalt (pink) is complementary to a mixture of iron and copper (bluish green); a solution of iron (yellow) to a mixture of copper and cobalt (violet); and a solution of copper (blue) to a mixture of cobalt and iron (red). But, as Mr. Bayley shows, a solution of copper is exactly complementary to the red reflection from copper, and a polished plate of this metal viewed through a solution of copper salt of a certain thickness is silver-white. As a further consequence it follows that a mixture of iron (7 parts) and cobalt (6 parts) is identical in color with a plate of copper. The resemblance is so striking, that a silver or platinum vessel covered to a proper depth with such a solution, is indistinguishable from copper.

There is a curious fact regarding nickel, also worthy of attention. The metal forms solutions which can be exactly simulated by a mixture of iron and copper solutions; but this mixture contains more iron than that which is complementary to cobalt. Nickel solutions are almost complementary to cobalt solutions, but they transmit an excess of yellow light. Now the atomic weight of nickel is very nearly the mean of the atomic weight of iron and copper, but it is a little lower, that is, nearer to iron. There is thus a perfect analogy between the atomic weights and the color properties in this case. This analogy is even more general, for Mr. Bayley states that in the case of iron, cobalt and copper, the mean wave length of the light absorbed is proportional to the atomic weight. The specific chromatic power of the metal varies, being least for copper. The specific chromatic power increases with the affinity of the metal for oxygen. Chromium forms three kinds of salts—pink salts, identical in color with the cobalt salts; blue salts, identical in color with copper salts; and green salts, complementary to the red salts.

Manganese, in like manner, forms more than one kind of salt. The red salts of manganese are identical in color with the red cobalt salts and with the red chromium salts. The salts of chromium and manganese, according to the author, are with difficulty attainable in a state of chromatic purity. He thinks that these properties of the metals lead up to some very interesting considerations.—*Chemical Review.*

**MOTH PREVENTIVE.**—A correspondent of the *Furniture Gazette* recommends the following remedy for exterminating moths in carpets and furniture: After some years of experience with the troublesome pests, says the writer, I found a sure preventive of moths in pitch paper, the same as roofers use. The moth will live and grow on cayenne pepper and tobacco, while I never could see that the use of these articles kept the moth miller out. The plan for the furniture dealer or housewife is to cut the paper in slips and place about the room, under and behind sofas, chairs, etc.; this should be done as early as the middle of April, and in warm climates earlier. If the dealer wishes to make parlor suits moth proof, he should place on the inside of backs of chairs and seats, small strips of pitch paper, and rest assured that the miller will not select these places to deposit eggs. It is the miller that is the foundation of all the mischief.

## CHIPS.

At a conflagration a worthy citizen gazes with stupefaction on the steam fire-engines. "Well, I never," he says with deliberation. "I never expected to see such criminal, senseless wastefulness! The idea of warming the water before throwing it on the flames."

A NEWSPAPER canvassing agent, being told by an old lady that it was no use to subscribe for the papers now, as Mother Shipton said the world was coming to an end this year, said, "But won't you want to read an account of the whole affair, as soon as it's over?" "That I will," answered the lady, and she subscribed.

"MOTHER," remarked a Duluth girl, "I think Harry is going to propose to me." "Why so, my daughter?" queried the old lady, laying down her spectacles, while her face beamed like the moon in its fourteenth night. "Well, he asked me this evening if I wasn't tired of living with such a menagerie as you and dad."

SAY, mister," said a man, as he entered the office, "is the editor in?" "Yes," replied that overworked individual, looking over his glasses. "Well, I thought you was the chap. I wanted to tell you about a boy of mine; you ought to have him; he's just the fellow you ought to have on your paper; he's the darndest fool I ever see."

A NEWLY married lady, who, as in duty bound, was very fond of her husband, notwithstanding his extreme ugliness of person, once said to a witty friend: "What do you think! My husband laid out 50 guineas for a large baboon, just to please me!" "The dear little man!" cried the other. "Well, it's just like him!"

A GALVESTON school teacher asked a new boy: "If a carpenter wants to cover a roof 15 ft. wide by 30 broad with shingles 5 inches broad by 12 long, how many shingles will he need?" The boy took up his hat and slid for the door. "Where are you going?" asked the teacher. "To find a carpenter. He ought to know that better than any of we fellows."

A CRITIC, dropping into a studio in Paris the other day, stopped before the portrait of a lady on the easel, and remarked: "It is very nicely painted; but why did you take such an ugly model?" "It is my mother," calmly replied the artist. "Oh! pardon a thousand times," said the critic in great confusion. "You are right; I ought to have perceived it; it resembles you completely."

JO T—was a small boy, about six. Jo's father said, and Jo standing in his presence, "How is it Jo, the cherry tree has a limb broken off!" Jo is hurt. Jo has lost his shoes. Shoe tracks go right up to the tree in question. Jo's shoes are by the trunk of the tree, and barefoot tracks are away from the tree. How is it? Jo hears it all; then said: "I think plenty of mice are up in the barn, what do you think?" Now, what is the conclusion? Jo must be somewhat absent minded.

WATERING-PLACE trunks (observe no attempt to advertise Saratoga here) are made with two wings and a back door this season. They are put on rollers and drawn to the hotel by horse-power windlases. They are then attached to the building, and the bells of the resort go inside and lives. A neat thing in the way of a bronze ventilator has been attached to the lids, and the trunks are every way more comfortable than an entire suite of rooms in the hotel proper.

THERE was joy on the farm when Ben, the oldest boy, came back from college in his sophomore year, and the village was proud of him. "Cheese it, cully," he said when he met an old friend, the son of a neighbor who joined farms with his father; "cheese it, cully; shove us your flipper; clench daddies, pardy. How's his nibe, and what's the new racket?" And his proud old father said: "It was just worth mo'n twice the money to hear Ben rattle off the Greek just like a livin' language."